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Proposed Rulemaking (USCG-2001-10486) - Standards for Living Organisms in Ships' Ballast Water Discharged in US Waters - Request for Comments.

These comments have been prepared by Steve Hillman, Principal Project Officer of the Australian Ballast Water Treatment Consortium (ABWTC), an Australian Federal Government and industry funded group. ABWTC's mission is to develop an operational pilot plant for assessing effective yet practicable treatment of ships' ballast water using existing technologies. Several Consortium members have provided input to the following comments.

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Q1. Should the Coast Guard adopt G1, G2, G3 or some other goal for BWT?
Goals 1 and 2 are highly conservative, idealised and would be extremely expensive (in terms of installation, operation, monitoring, maintenance, ongoing certification and compliance checking, etc), if based on available, proven technologies. They reflect a desire to reach a (presently) virtually unattainable goal of risk elimination, versus an acceptable level of risk reduction. We question how the goal of treating to an equivalent standard for drinking water (G2) is relevant to seawater or brackish water (i.e. any non-potable water due to salt contents >0.6 gm/L).

We believe there is no environmentally safe, practicable and cost-effective BWT system, using existing or near-future technology, which can kill or inactivate **all** life stages of **all** zooplankton and photosynthetic organisms. We also question why ships should be required to reduce Enterococci and E. coli concentrations in ballast water to levels that will be lower than those frequently found in most US port waters due to urban and rural sources within the port's catchment. Goals G1 and G2 should not be supported unless existing data show clear evidence of unacceptably frequent BW-induced human illnesses and disease, and until a cost-benefit analysis unequivocally demonstrates improved human health epidemiology from reducing Enterococci and E. coli in BW. The latter would need to include consideration of the various pathways by which pathogens could be expected to impact on health after ballast discharge.

More cogent arguments could be made for BWT goals which focus on lowering concentrations of cholera strains of *Vibrio* bacteria. Similarly, in the context of protecting local marine ecosystems (including biodiversity of native species), it would be more cost effective for ballast water treatment standards to be focussed on the removal/reduction of the BW transferable life stages of known potential invaders. In the case of the transferable and highly robust cysts of toxic dinoflagellates (which can threaten aquaculture, human health and local ecosystems) it seems likely that efficient BWE, coupled with prohibition of ballast tank sediment discharge, will remain 'the treatment of choice' in terms of cost-effectiveness and ease of compliance checking.

Goal G3 is consistent with the Interim Rule, 64 FR 26672, although there is a widespread realisation and understanding of the difficulties associated with 'direct comparison with ballast water exchange' (as identified and discussed at last year's GloBallast Workshop, the ETI Conference in Singapore, and summarily reviewed in USCG's current briefing document).

Nevertheless G3 is the **type** of standard most likely to receive the widest level of understanding, support and recognition by the US and international shipping industry (including flag states and port states). It is also necessary to acknowledge that a practical BWT standard enabling achievable treatment alternatives to BWE needs to be implemented as soon as possible, so that equivalent and reliable risk reductions can be achieved by vessels and trading routes that do not have access to safe and complete 'blue-water' BWEs. In other words, invasion rates can be slowed much faster by adopting a standard that encourages the installation, real-world use and comparison of '1st generation' BWT systems now, rather than an ecologist's ideal standard that lies beyond the horizon of current viable technologies.

If these points have any validity and relevance with respect to the aims of NANPCA and NISA, then the issue of G3 with respect to the vagaries of actual BWE outcomes can be side-stepped by adopting the theoretical 'best-case' outcome of the BWE concept, which is to achieve a minimum 95% reduction in the numbers of all plants and animals via an idealised 'blue-water' BWE (i.e. under favourable ocean conditions on a modern vessel with an experienced crew, with even distribution of biota within a tank and no discharge avoidance behaviour). Certification and compliance testing of BWT systems tested and installed for achieving 95% reductions would follow the basic methods outlined in the Globallast Workshop.

We also believe that the formulation of any BWT Standard should not ignore the systems already being put in place for determining the need for ballast water treatment (i.e. BW micro-management, BWMPs, source/reception risk assessments, Port State Decision Support Systems, etc).

Q2. Should the Coast Guard adopt any of the standards, S1-S4 as an interim BWT standard?

Of the suggested standards for an interim BWT, the most realistic and achievable for promoting the design, installation and testing of reliable ship-board and on-shore systems are Standards S1 and S2 (GloBallast Proposals A and B). There are several major reservations about using the "highest natural concentrations in the world", and standard S1 may be better based on initial concentrations derived from "highest expected concentrations in port waters". The value and benefits of using of either a parametric approach to define the 'worst-case' conditions for treatment (e.g. three standard deviations above typical mean concentration of each test species) or a non-parametric approach (e.g. Upper 95th percentile from the median port water concentration for test species) also deserve serious attention.

It may be found that the best available technology can only achieve, say an 85% or 90% kill or inactivation rate under the defined worst-case conditions. If so, the interim BWT standard should be written, with this in mind, i.e. in a form that allows the actual test results to be part of the certification. Given the uncertainties associated with the efficacy of BWE and the safety issues involved, open certification of the lower standard for a particular test species allows the Port State to decide the acceptability of the treatment versus other BW management methods available at that time and for that particular vessel.

Q3. Please provide information on the effectiveness of current technologies to meet any of the possible standards. Please comment, with supporting technical information if

possible, on the workshop participants' assessment that these standards are "practical and realistic initial targets".

We consider a 95% level to the highest that can be considered practical and realistic for the majority of potential test species listed at the Globallast meeting. The Australian Ballast Water Treatment Consortium will be piloting combinations of existing technology (filters plus UV, sonic and turbulent energies) to evaluate what levels of organism removal/kill/inactivation are feasible for each major biotic group.

Q4. General comments on how to structure any cost-benefit or cost-effectiveness analysis that evaluates the above four possible standards.

The ABWTC will be undertaking various cost-benefit studies, but not for Standards where there is no viable technology available (i.e. 100% or 99% removals of all stages of all plants and animals). Actual costs of potential treatment standards can be compared with costs presently experienced by the shipping industry with respect to BWE. Hidden costs include factors for hull life shortening and human safety. Litigation potential exists if it is demonstrated that a vessel did not take all reasonable precaution to avoid discharge of 'polluted' ballast, according to particular State and Federal regimes applying in a port.

Q5. What impact would the above four standards have on small businesses that own and operate vessels?
S1 and S2 standards would have less impact than S3 or S4 for any business, small or large.

Q6. What potential environmental impacts would the goals or standards carry?
Any standard must have a net environmental benefit. No standard should be considered if it will promote regular use and discharge of unwanted toxicants at significant levels, such as chloro-amines, free halides, etc.